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Patentanmeldung Nr. Patent application No. Demande de brevet n°

03101162.0 ✓

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If no title is shown please refer to the description.
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Foldable irradiation device

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Foldable irradiation device

The invention relates to an irradiation device, comprising a base part, a support, longitudinally extending from the base part and enclosing an angle (α) with an imaginary vertical axis, a housing comprising a central axis, at least one radiation unit and a radiation emission plane, said housing being pivotally connected to said support via a pivot axis, said housing being pivotable between an operational position, in which the radiation emission plane extends in an imaginary horizontal plane, and a rest position, in which the radiation emission plane extends in an imaginary vertical plane, and the central axis of the housing encloses the angle (α) with the imaginary vertical axis.

An irradiation device of the type described in the opening paragraph is generally known. A known irradiation device is for example used for irradiating the human body with ultraviolet radiation. The support extends longitudinally from the base part enclosing an angle with an imaginary vertical axis. The housing is provided with an ultraviolet radiation unit, and in operation the ultraviolet radiation leaves the housing through the radiation emission plane. Said housing is pivotally connected to the support via a pivot axis. In the operational position of the housing the radiation emission plane extends in an imaginary horizontal plane, and in the rest position the radiation emission plane extends in an imaginary vertical plane, the central axis of the housing enclosing the angle (α) with the imaginary vertical axis. After use the device can be folded to a more compact configuration for storage purposes, by rotating the housing about the pivot axis relative to the support.

A user has to execute two rotational operations to move the housing in a position parallel with the support. First, the housing has to be rotated from its operational position to a position in which the radiation emission plane extends in the imaginary vertical plane. Then the housing has to be rotated within this vertical plane towards the rest position in which the central axis of the housing encloses the angle (α) with the imaginary vertical axis. This is cumbersome for the user, and it requires additional hinge points which render the construction more expensive and vulnerable.

It is an object of the invention to provide an irradiation device which is easily foldable and which has a solid folding mechanism. To achieve this object, an irradiation device according to the invention is characterized in that the pivot axis extends from the support enclosing an angle ($\alpha/2$) with the imaginary horizontal plane and with the imaginary vertical plane. Because of the arrangement of the pivot axis at this angle relative to both these planes, the housing can be fluently rotated about the pivot axis between the operational position and the rest position. The movement of the housing from the operational position to the rest position, and vice versa, requires only a single rotation about a single pivot axis. This is advantageous both when the irradiation device is to be put up before use and when it is to be stored after use, and thus enhances the user-friendliness of the device. Furthermore, in this manner no additional hinge points are required, which renders it a solid construction.

An embodiment of an irradiation device according to the invention is characterized in that a blocking system is provided for releasably blocking the housing in its operational position and in its rest position relative to the support. In this manner it is ensured that the housing maintains its intended position relative to the support, which is especially important for the operational position in view of safety of the user.

An embodiment of an irradiation device according to the invention is characterized in that the blocking system comprises a cylindrical blocking element with protrusions which is provided coaxially with the pivot axis near an end of the pivot axis in the vicinity of its connection with the support, and a chamber provided in the housing for receiving said blocking element, comprising notches for co-operation with said protrusions. This provides an advantageous construction of the blocking system.

A further embodiment of an irradiation device according to the invention is characterized in that a connection system is provided for connecting the pivot axis to the support, which comprises a fastening element for receiving the axis which fastening element is attachable to the support, and a clamp element for clamping the axis in said fastening element.

An embodiment of an irradiation device according to the invention is characterized in that the device comprises a suntanning device.

The invention will be described in more detail hereinafter with reference to the drawings, in which

Fig. 1 shows a perspective view of an embodiment of an irradiation device according to the invention,

Fig. 2a and b show a schematic top view and a schematic side view, respectively, of an upper part of the irradiation device of Figure 1,

Figs. 3a, b and c show a schematic side view of the irradiation device of Figure 1 when it is being moved from an operational position to a rest position,

Fig. 4 shows an exploded view of a blocking system of the irradiation device according to the invention, and

Fig. 5 shows an exploded view of a connection system of a further embodiment of an irradiation device according to the invention, and

Figs. 6a and 6b show a schematic view of a further irradiation device, and a schematic view of an upper part of the irradiation device of Figure 6a, respectively.

Figure 1 shows an irradiation device 1 according to the invention, comprising a base part 2, a support 3, longitudinally extending from the base part 2 at an angle α relative to an imaginary vertical axis V. It is noted that, although in this embodiment the device is a suntanning device, it may also comprise other types of irradiation devices. The device comprises furthermore a housing 4 comprising a central axis 5, at least one radiation unit 6 and a radiation emission plane 7. The radiation unit 6 in this embodiment comprises compact HPA lamps, but it is noted that any known type of radiation unit can be applied. The radiation emission plane 7 is the plane through which the radiation leaves the housing during operation of the device. The housing 4 is pivotally connected to said support 3 via a pivot axis 8. The housing 4 is pivotable between an operational position A (see Figure 2a and 3a), in which the radiation emission plane extends in an imaginary horizontal plane X, and a rest position B, in which the radiation emission plane extends in an imaginary vertical plane Y, and the central axis 5 of the housing 4 encloses the angle (α) with the imaginary vertical axis, in this embodiment extending parallel to the support (see Figure 3c).

As can be seen in Figures 2 a and b, the pivot axis 8 extends from the support 3 enclosing an angle ($\alpha/2$) with the imaginary vertical plane Y and with the imaginary horizontal plane X. In this manner the housing can be moved from its operational position A, as shown in Figure 3a, to its rest position B, as shown in Figure 3c, by means of a single rotation about a single pivot axis. Figure 3b shows an inbetween position of the housing between the position A and B, which is not a static position, but a position that occurs during

the fluent movement of the housing about the pivot axis 8 from position A to B. Because the pivot axis is arranged in the above described manner, the device according to the invention can be easily folded for storage purposes, which enhances the user-friendliness of the irradiation device, while it also comprises a solid construction.

Figure 4 shows an exploded view of a blocking system 10 of an irradiation device 1 according to the invention. The blocking system 10 is provided for releasably blocking the housing 4 in its operational position A and in its rest position B relative to the support 3. In this embodiment the blocking system 10 comprises a blocking element 11 with protrusions 12, which is provided coaxially with the pivot axis 8 near an end of the pivot axis 8 in the vicinity of its connection to the support 3. A chamber 13 for receiving said blocking element 11 is provided in the housing 4, here shown as an inner part of the housing, said chamber 13 comprising notches 22 for co-operation with said protrusions 12. The notches receive the protrusions, depending on the rotational movement of the housing, and thus of the chamber, relative to the pivot axis, and thus relative to the blocking element. With this construction it is ensured that the housing 4 maintains the position in which it is set by the user, this position being either the operational position or the rest position. In the operational position the blocking system prevents an unsafe situation for the user of the device, which would occur when the housing would rotate by itself about the pivot axis while a user is present beneath the radiation emission plane. In the rest position the blocking system prevents damaging of the housing or objects present near the device, which would occur when the housing would rotate by itself about the pivot axis while it is stored away.

Figure 5 shows an exploded view of a connection system 30 of a further embodiment of an irradiation device 1' according to the invention. The connection system 30 is provided for connecting the pivot axis 8 to the support 3, and comprises a fastening element 31 for receiving the axis 8, which element is attached to the support 3, and a clamp element 32 for clamping the axis 8 in said fastening element. It is noted that other types of connection systems can be applied to connect the axis to the support. For example the connection system as shown in Figure 4 can be applied, this system comprising two housing parts which are connectable to the support and between which the axis is clamped.

It is noted that, although the irradiation device as described in the above embodiments comprises a suntanning device, the irradiation device according to the invention may also comprise other types of irradiation devices. Medical irradiation devices and devices for illumination can for example also benefit from the advantages resulting from the invention.

It is noted, that in an irradiation device, comprising a base part, a support, longitudinally extending from the base part and enclosing an angle (α) with an imaginary vertical axis, a housing comprising a central axis, at least one radiation unit and a radiation emission plane, said housing being pivotally connected to said support via a pivot axis, said housing being pivotable between an operational position, in which the radiation emission plane extends in an imaginary horizontal plane, and a rest position, in which the radiation emission plane extends in an imaginary vertical plane, and the central axis of the housing encloses the angle (α) with the imaginary vertical axis, other means may be provided for easily moving the housing between the operational position and the rest position.

Said means comprise a gear system comprising a first gear wheel provided at the connection point of the support with the lamp housing, a second gear wheel for co-operation with the first gear wheel, which is connected to the lamp housing and is rotatable about the pivot axis, the diameter of the first gear wheel being related to the diameter of the second gear wheel as: diameter first gear wheel = diameter second gear wheel x (90/ α). In this manner the housing can be moved by the user from the operational position to a position parallel with the support, by executing only one rotational operation. This is advantageous both when the irradiation device is to be put up before use and when it is to be stored after use, and thus enhances the user-friendliness of the device.

Figure 6a shows an irradiation device according to the invention, comprising a base part (not shown), a support 53, longitudinally extending from the base part and enclosing an angle (α) with an imaginary vertical axis V, a housing 54 comprising a central axis, at least one radiation unit 56 and a radiation emission plane 57, said housing being pivotally connected to said support via a pivot axis 58, said housing being pivotable between an operational position, in which the radiation emission plane extends in an imaginary horizontal plane, and a rest position, in which the radiation emission plane extends in an imaginary vertical plane, and the central axis of the housing encloses the angle (α) with the imaginary vertical axis. It is noted that, although in this embodiment the device is a suntanning device, it may also comprise other types of irradiation devices.

Figure 6b shows an upper part of the irradiation device in more detail. The gear system 60 comprises a first gear wheel D1 provided at the connection point of the support 53 with the housing 54, and a second gear wheel D2 for co-operation with the first gear wheel D1, which is connected to the housing 54 (not shown in the Figure) and is rotatable about the pivot axis 58. The second gear wheel D2 is fixedly fastened to the housing and can only rotate together with the housing. The pivot axis 58 is pivotally connected to the

support 53 via a further pivot axis 68. The diameter of the first gear wheel D1 is related to the diameter of the second gear wheel D2 as: diameter first gear wheel D1 = diameter second gear wheel D2 x (90/ α). With this gear ratio, the housing 54 can be moved in one rotational movement over 90° from the operational position to the rest position parallel to the support, and vice versa. In this embodiment the gear wheels D1 and D2 comprise conoid gear wheels, but it is noted that other known types of gear wheels may be applied.

CLAIMS:

1. An irradiation device (1), comprising:
- a base part (2),
- a support (3), longitudinally extending from the base part (2) and enclosing an angle (α) with an imaginary vertical axis V,
- a housing (4) comprising a central axis (5), at least one radiation unit (6) and a radiation emission plane (7), said housing (4) being pivotally connected to said support via a pivot axis (8),
- said housing (4) being pivotable between an operational position (A), in which the radiation emission plane (7) extends in an imaginary horizontal plane (X), and a rest position (B), in which the radiation emission plane (7) extends in an imaginary vertical plane (Y), and the central axis (5) of the housing (4) encloses the angle (α) with the imaginary vertical axis (V),

characterized in that the pivot axis (8) extends from the support enclosing an angle ($\alpha/2$) with the imaginary horizontal plane (X) and with the imaginary vertical plane (Y).

2. An irradiation device as claimed in Claim 1, characterized in that a blocking system (10) is provided for releasably blocking the housing (4) in its operational position (A) and in its rest position (B) relative to the support (3).

3. An irradiation device as claimed in Claim 2, characterized in that the blocking system (10) comprises:
- a cylindrical blocking element (11) with protrusions (12) which is provided coaxially with the pivot axis (8) near an end of the pivot axis (8) in the vicinity of its connection with the support (3),
- a chamber (13) provided in the housing (4) for receiving said blocking element (11), comprising notches (22) for co-operation with said protrusions (12).

4. An irradiation device as claimed in Claim 1, characterized in that a connection system (30) is provided for connecting the pivot axis (8) to the support, which comprises:

- a fastening element (31) for receiving the axis (8), which is attachable to the support (3),
- a clamp element (32) for clamping the axis (8) in said fastening element (31).

5. An irradiation device as claimed in any of the preceding Claims, characterized in that the device (1) comprises a suntanning device.

ABSTRACT:

The invention relates to an irradiation device (1), comprising a base part (2), a support (3), longitudinally extending from the base part (2) and enclosing an angle (α) with an imaginary vertical axis V, a housing (4) comprising a central axis (5), at least one radiation unit (6) and a radiation emission plane (7), said housing (4) being pivotally connected to said support via a pivot axis (8), said housing (4) being pivotable between an operational position (A), in which the radiation emission plane (7) extends in an imaginary horizontal plane (X), and a rest position (B), in which the radiation emission plane (7) extends in an imaginary vertical plane (Y), and the central axis (5) of the housing (4) encloses the angle (α) with the imaginary vertical axis (V), the pivot axis (8) extending from the support enclosing an angle (α/2) with the imaginary horizontal plane (X) and with the imaginary vertical plane (Y). Because of the arrangement of the pivot axis at this angle relative to both these planes, the housing can be fluently rotated about the pivot axis between the operational position and the rest position. The movement of the housing from the operational position to the rest position, and vice versa, requires only a single rotation about a single pivot axis.

Fig. 2a

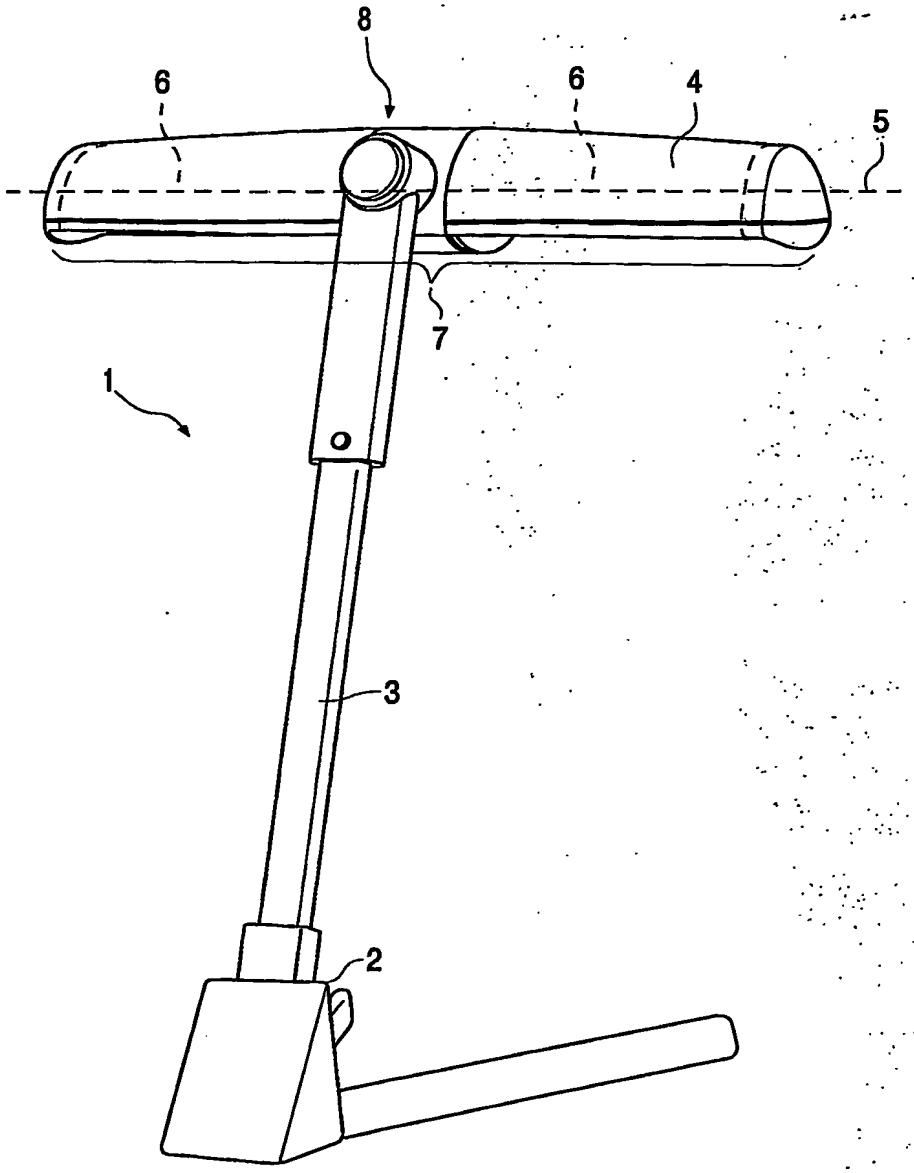

FIG. 1

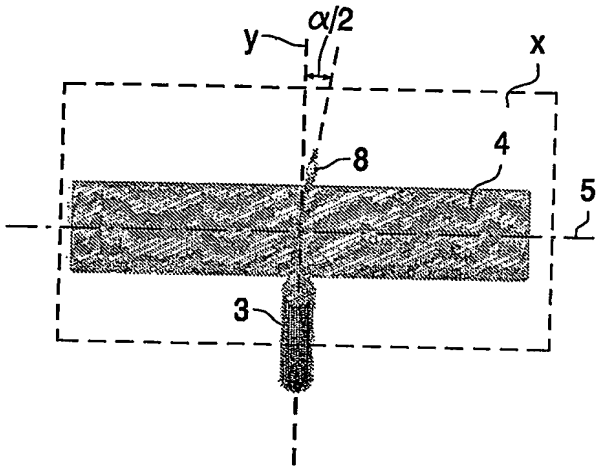

FIG. 2a

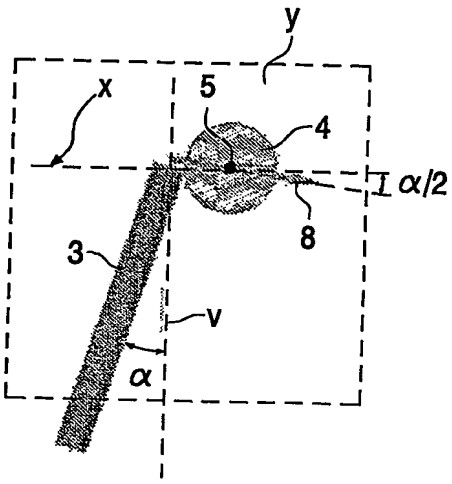

FIG. 2b

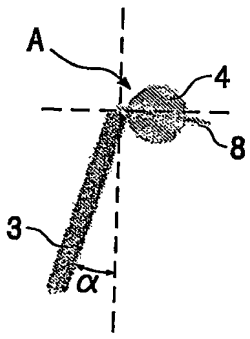

FIG. 3a

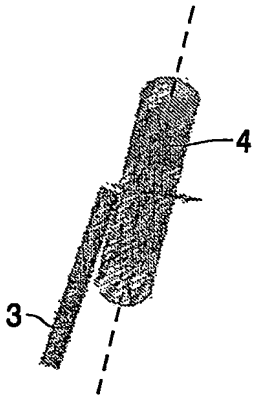

FIG. 3b

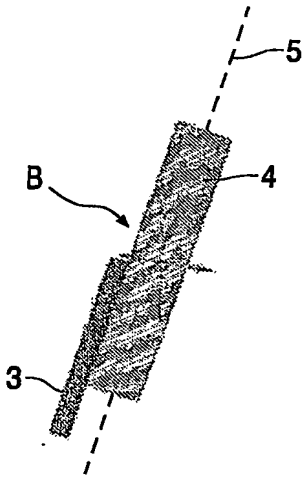

FIG. 3c

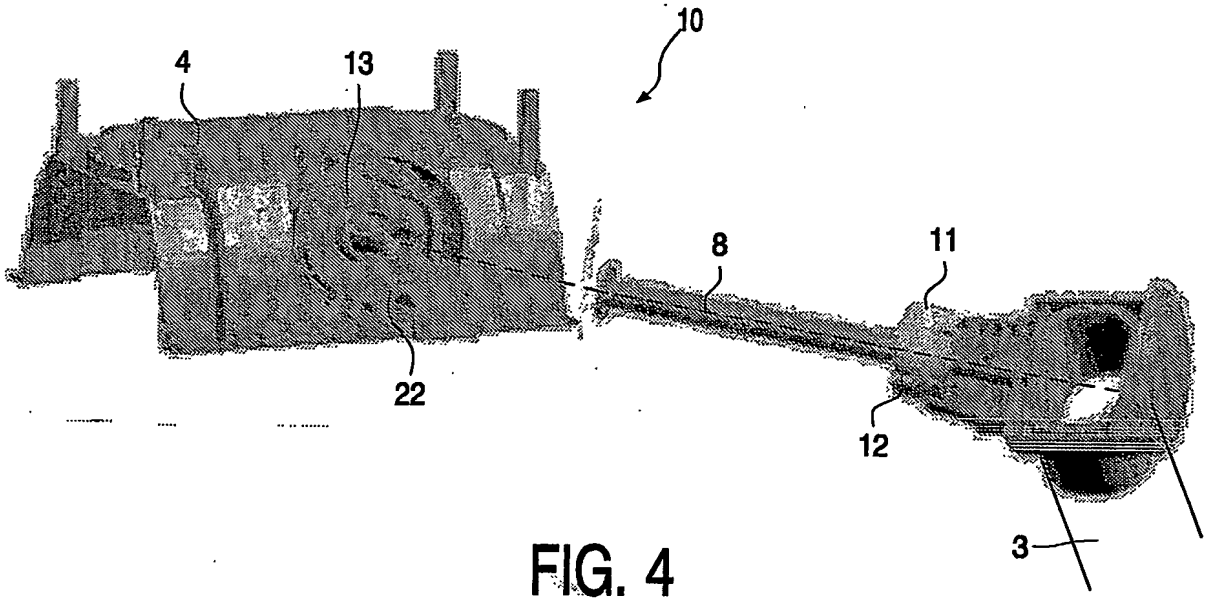

FIG. 4

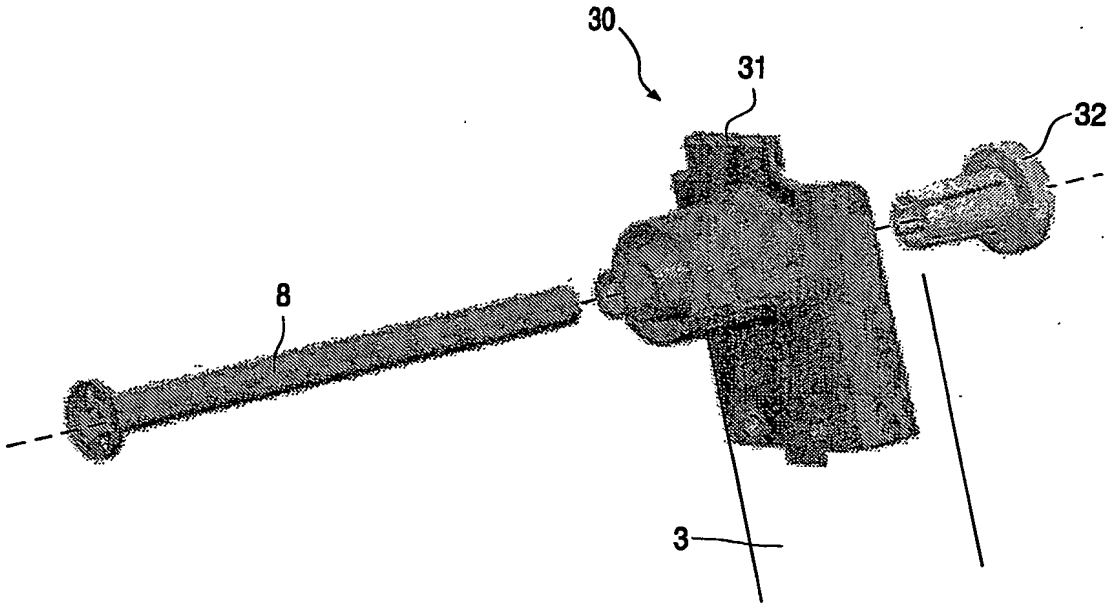

FIG. 5

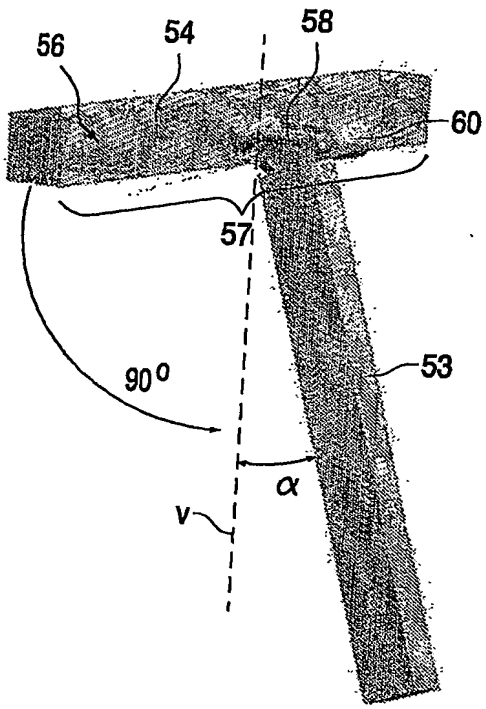

FIG. 6a

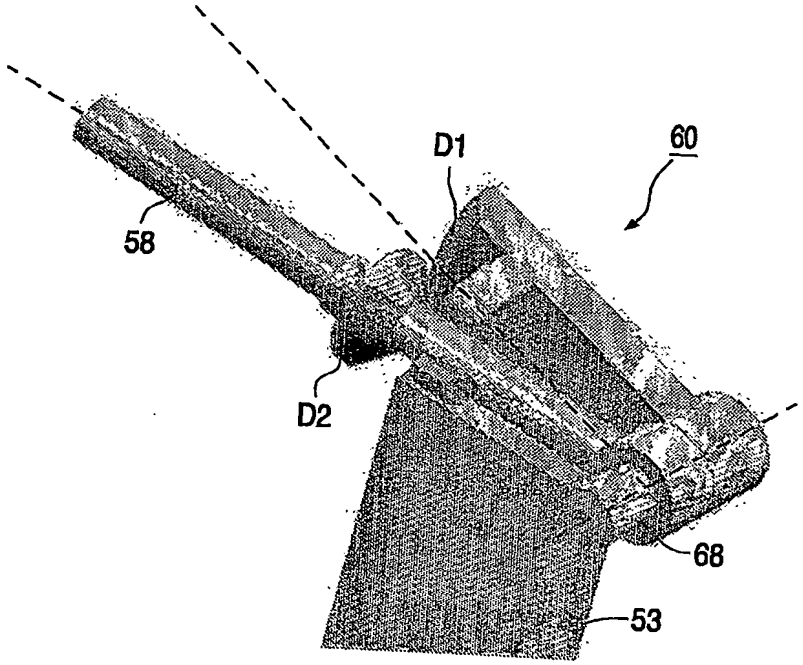

FIG. 6b